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ABSTRACT

This module, one of a set of seven instructional materials designed for competency-based vocational education administrator education, is designed to help the learner develop skills in implementing competency-based instruction (CBI) in vocational education. Following introductory material discussing the organization of the module, the module's terminal objective and four enabling objectives are presented along with information on required and optional resources. Major content is comprised of four sequential learning experiences, each directed toward helping the learner accomplish one of the module's four enabling objectives. Titles of the learning experiences are Introduction to Competency-Based Instruction, Administrative Concerns in Implementing Competency-Based Instruction, Vocational-Technical Education Consortium of States, and Implementing CBI. Each experience includes an information sheet which provides additional information on the topic of the experience, an explanation of the activity, a self-check, and model answers to serve as feedback. The final learning experience is designed to allow application of learning in an applied setting. The module concludes with module assessment and administrator performance forms designed to test the exit competence of the learner. (SH)

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IMPLEMENTING COMPETENCY-BASED INSTRUCTION IN VOCATIONAL EDUCATION

Competency-Based Administrator Education Module

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U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Competency-Based Administrator Education Project
Division of Vocational and Technical Education
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INTRODUCTION

Many vocational technical schools are giving strong consideration to the implementation of instruction which focuses directly on developing those tasks, skills, attitudes, values, and appreciations that are deemed critical for successful employment (competency-based instruction). Competency-based instruction (CBI) has come on the scene as a viable alternative to traditional instruction and cannot easily be ignored. There are several aspects of competency-based instruction which distinguish it from traditional instruction. CBI differs from other modes of instruction in key areas such as student progress through the program, the ways that each student is assessed, and the actual content base for instruction.

If a successful CBI program is to be developed, it is vital for the vocational administrator to be knowledgeable about CBI concepts and aware of how a program of this type may be implemented. Administration of CBI is different from that of administering traditional instruction in several respects. Increases occur in teacher involvement at all levels, in requirements for out-of-school instruction, and in student responsibilities.

The learning experiences in this module are designed to help you develop skills in implementing CBI. You will develop expertise in areas such as orienting teachers to their new roles in competency-based instruction and developing CBI implementation plans.

MODULE STRUCTURE AND USE

ORGANIZATION

This instructional module is a set of experiences intended to facilitate your demonstration of the objectives detailed below. An introduction and four sequential learning experiences are contained in this module.

Two types of objectives form the basis of the learning experience: a terminal objective and an enabling objective. The enabling objective is designed to help you achieve the terminal objective. The learning experience has activities to help you accomplish the objective, and by use of the feedback devices provided, you should be able to determine if you have reached each objective. The first learning experience is designed to provide you with the needed background information. The second, third, and fourth learning experiences give you an opportunity to apply that information in practical situations. The final assessment is designed to allow you to plan strategies for implementing competency-based instruction in a case study. It requires repeating all previous learning experiences in an application to a new situation representing a school setting.

OBJECTIVES

This module includes five objectives:

Terminal Objective: Plan strategies to implement instruction which focus directly on developing those tasks, skills, attitudes, values, and appreciations that are deemed critical for successful employment (competency-based instruction). Your competence will be assessed by your resource person using the standards contained in the "Performance Assessment Form," pp. 45-46.

Enabling Objective #1: Demonstrate knowledge of the rationale for implementing competency-based instruction in vocational-technical schools (Learning Experience I).

Enabling Objective #2: Identify administrative concerns in implementing competency-based instruction in vocational-technical education (Learning Experience II).

Enabling Objective #3: Demonstrate knowledge of the procedure used to identify occupational objectives; the various ways teachers can use the occupational objectives; and implications for administration, such as course credit and graduation credit, and occupational certification (Learning Experience III).

Enabling Objective #4: Prepare a written plan for menting key aspects of competency-based instruction in a vocational program (Learning Experience IV).

PROCEDURE

After reading the "Introduction," p. 1, and the objectives listed above, you should be able to determine how much of this module you will need to complete in order to be competent in implementing competency-based instruction.

* If you already have the necessary background knowledge and practice required for proficiency in implementing competency-based instruction, you may not need to complete Learning Experiences I-IV.

* Instead, with the approval of your resource person, you may choose to proceed directly to the Module Assessment.

* You may wish to skim the overviews for Learning Experiences I-IV and to skim the final assessment. These pages will provide you with more specific information for deciding which experiences you need to complete.

RESOURCES

Listed below are the outside resources which supplement those contained within the module. Check with your resource person to determine the availability and the location of the resources.

REQUIRED RESOURCES

Resource Person

* Your resource person must be contacted to assess your performance in implementing competency-based instruction in a case study situation representing a school setting.

Reference

* "V-TECS Catalog of Performance Objectives, Criterion-Referenced Measures and Performance Guides for Food Management, Production and Services Occupations" (Learning Experience III).

OPTIONAL RESOURCES

Resource Person

* Your resource person may be contacted if you have any difficulty with directions, or in assessing your progress at any time.

Resource Person and/or Peers (e.g., Other Students)

* If you wish to discuss the information contained in

the reading or to compare your written responses through discussion, you can set up a seminar-type meeting with peers and/or your resource person (Learning Experience I).

TERMINOLOGY

Competency-Based Instruction refers to instruction which focuses directly on developing those tasks, skills, attitudes, values, and appreciations that are deemed critical for successful employment.

Competencies are those tasks, skills, attitudes, values, and appreciations that are deemed critical for successful employment.

LEARNING EXPERIENCE I

ENABLING OBJECTIVE
Demonstrate knowledge of the rationale for implementing competency-based instruction in vocational-technical schools.

Read Read the "Information Sheet," pp. 6-8.

Optional Activity Defend in writing the need for competency-based instruction in vocational-technical schools.

Feedback Demonstrate knowledge of the rationale for implementing competency-based instruction in vocational-technical schools by preparing a speech on the "Rationale of Competency-Based Instruction."

OR

Write a rationale for implementing competency-based instruction to be presented to the chief instructional officer of the school.

OR

Evaluate your competency by comparing your completed "Self-Check," p. 9, with the "Model Answers," p. 10.

INFORMATION SHEET

AN INTRODUCTION TO COMPETENCY-BASED INSTRUCTION

The focus of competency-based instruction (CBI) is quite different from other types of instruction. In a broad sense, any mode of instruction aims at or should aim for competence of students and graduates. However, CBI does not differ from other modes of instruction in its goals. Instead, CBI is unique in terms of its underlying assumptions and the approaches which characterize it. Specifically, competencies for vocational and technical education are those tasks, skills, attitudes, values, and appreciations that are deemed critical to successful employment.

There are several aspects of CBI which distinguish it from traditional instruction. These include the nature of competencies, criteria used to assess the competencies, ways that student competence is assessed, student progress through the program, and the program's instructional content.

In the assessment process, criteria associated with each competency have to reflect both the level of acceptable performance and the conditions associated with this performance. When student competence is being assessed, primary consideration should be given to application. Since degree of student competency and not grading serves as the primary evidence of achievement, traditional knowledge types of measures such as written examinations are, in many cases, replaced by assessment which aligns with worker competence in the real world.

In contrast with a time-based mode divided into clearly identifiable time frames such as years or terms, competency-based instruction uses demonstrated competence as a determinant of student progress toward program

completion. This enables students to proceed through a program at their own particular rates, based upon their individual abilities, and thus master specified competencies in a shorter (or longer) time period.

For further clarification of distinguishing characteristics between a competency-based and a traditional program, a comparison chart is shown in Figure 1 on the following page. As noted in Figure 1, the basic intent of competency-based instruction is to facilitate student achievement of competencies specified in the program. Each instructor is, therefore, obligated to provide a sufficient variety of learning experiences so that students will be afforded an opportunity to master a minimum set of competencies. In effect, the instructor may be held accountable for student achievement.

REFERENCES

Burns, Richard W., and Joe Lars Klingstedt, eds. Competency-Based Education, An Introduction. Englewood Cliffs, New Jersey: Educational Technology Publications, 1973.

Drumheller, Sidney J. Handbook of Curriculum Design for Individualized Instruction, A Systems Approach. Englewood Cliffs, New Jersey: Educational Technology Publications, 1972.

Finch, Curtis R., and John R. Crunkilton. Curriculum Development in Vocational and Technical Education. Boston: Allyn and Bacon, forthcoming.

Optional Activity

You may wish to defend in writing the need for competency-based instruction in vocational-technical schools. This paper could include: the advantages of competency-based instruction for students along with procedures for aligning competency-based instruction with existing instructional programs.

You may then wish to compare your paper with those of several of your peers, as well as brainstorm new ideas with them.

Figure I - Comparison of a Traditional and a Competency-Based Program

Characteristics	Traditional Program	Competency-Based Program
1. Competencies to be demonstrated by the student are:	·derived from committee consensus ·stated in general terms ·seldom made public	·derived from explicit concepts of worker roles ·stated so that competence may be assessed ·made public in advance
2. Criteria to be employed in assessing competencies are:	·based upon general program objectives ·general in stating mastery levels ·seldom made public	·based upon specified competencies ·explicit in stating levels of mastery under specified conditions ·made public in advance
3. Assessment of the student's competency	·uses course grades as evidence of competence ·may include performance as well as knowledge ·may focus on objectivity	·uses performance as evidence of competence ·takes student knowledge as it relates to performance into account ·strives for objectivity
4. Student rate of progress through program is determined by:	·time of course completion	·demonstrated competency
5. Instructional program is intended to:	·facilitate student achievement of certain general program objectives	·facilitate development and evaluation of student achievement of specified competencies

The following statements and questions check your comprehension of the material in the "Information Sheet," pp. 6-8. Each of the items requires a short essay-type response. Please explain fully, but briefly, and make sure you respond to all parts of each item.

SELF-CHECK

1. Explain why competency-based instruction is especially appropriate for teaching occupational skills.

2. Is providing a variety of learning experiences a good idea? Why or why not?

3. How do criteria associated with each competency provide a basis for assessing student mastery?

4. How do traditional and competency-based instruction compare in terms of rate of student progress?

Compare your written answers on the "Self-Check" with the model answers given below. Your responses need not exactly duplicate the model answers; however, you should have covered the same major points.

MODEL ANSWERS

1. Competency-based instruction focuses on critical tasks, skills, attitudes, values, and appreciations for successful employment. When student competence is being assessed, primary consideration is given to application. Traditional knowledge types of measures such as written examinations are avoided in favor of assessment which aligns with worker competence in the real world.

2. Providing a variety of learning experiences is essential if students are to be given ample opportunity to master a minimum set of competencies. This is particularly important if you intend to provide for individual student differences.

3. The criteria associated with each competency must reflect both the level of acceptable performance and the conditions associated with this performance.

4. In contrast with a time-based instruction which is divided into clearly identifiable time frames such as years or terms, competency-based instruction uses demonstrated competence as a determiner of student progress toward program completion. This enables students to proceed through a program at their own particular rates, based upon their individual abilities, and thus master specified competencies in a shorter (or longer) time period.

LEVEL OF PERFORMANCE: Your completed "Self-Check" should have covered the same major points as the model answers. If you missed some points or have questions about any additional points you made, review the material in the "Information Sheet," pp. 6-8, or (if necessary) check with your resource person.

- - - - - - - - * - - - - - - - -

LEARNING EXPERIENCE II

ENABLING OBJECTIVE

Identify administrative concerns in implementing competency-based instruction in vocational-technical education.

Read Read the "Information Sheet," pp. 13-17.

Activity After reading the information sheet, briefly describe how you would approach each of the situations below.

Situation #1

Your superintendent asks you to begin a CBI program in mid-year, requiring all vocational teachers to submit concept outlines for their programs for the spring term. Also, one of the lesson plans the teachers submit each week is to follow the competency-based approach. To allow time to orient your teachers and provide for their involvement in overall program planning, you prefer postponement of program implementation until the next fall term. In addition, you wish to hire several teachers to work on a curriculum team during the summer months to prepare for the CBI implementation.

Action

Draft a memo responding to the superintendent's request which gives consideration to the comprehensive planning of total program objectives prior to implementing CBI.

Situation #2

All but two of your vocational teachers are unfamiliar with CBI. Most are willing to make curriculum changes but have indicated they desire assistance in becoming more knowledgeable about CBI and its impact on their individual programs. However, a few teachers seem to have negative attitudes toward change in general and/or CBI in particular. Most of the vocational teachers in your school have college degrees, but several do not.

Action

Describe in writing four initial experiences you could arrange to orient teachers in your vocational school to CBI.

Situation #3

At a recent faculty meeting your vocational teachers raised questions regarding student-related teaching and administrative activities when CBI is implemented. Their concerns are in the areas of student and teacher roles in individualized CBI, determination of student progress, grading, and official record-keeping for students. You have indicated you will respond to their concerns in writing.

Action

Prepare a written policy statement regarding student-related activities associated with implementing CBI. Give attention to each of the following areas:

a. teacher roles related to instruction
b. active student roles
c. factors related to student assessment
d. official record-keeping procedures for students

Feedback Compare your answers with the checklist on p. 20 to determine how well you covered major points.

INFORMATION SHEET

ADMINISTRATIVE CONCERNS IN IMPLEMENTING COMPETENCY-BASED INSTRUCTION

Three targets for educational change may be identified: people, organizations, and programs. Changes will be meaningful only to the extent that these targets are involved, interrelated, and directed toward the new emphasis (Houston, 1972, p. 7).

Organizing a CBI program and managing its initial operation requires an examination of program elements from several perspectives: institutional resources, faculty, and students. The type of CBI program delivery system used must be considered in relation to these various perspectives.

Optional Delivery Systems Such as Modules

The instructional module is increasingly being used to actualize competency-based programs. The module is an instructional "package" intended to facilitate the learner's mastery of stated objectives. While modules may be described in several different formats, Houston (1972, p. 74) includes five major sections.

Prospectus includes a clear statement of the rationale for the module's objectives, outlines the major assumptions upon which the module is based, identifies the relationship of this module to the program as a whole, outlines the major activities and alternatives in the module, and stipulates prerequisites. After reading the Prospectus, a student should be able to decide whether or not to continue.

Objective or set of closely related objectives, each of which is stated in clear, unambiguous terms which stipulate what the learner is to demonstrate upon successful completion of the module.

Preassessment includes two dimensions. The first measures the extent to which the learner has already mastered prerequisites to the module, while the second tests his or her potential competence in meeting the objectives of the module itself. On the basis of results, the learner may undertake part, all,

or none of the instruction. Preassessment may require demonstration of competencies by successful completion of written or oral tests, reaction to simulated episodes, or simply questions which elicit participant interest or needs. The module designer is not limited to one mode of assessment.

Enabling activities specify instructional alternatives for attaining module competence. Every module includes at least two means for achieving the objective. In addition to those identified by the module developers, learners may also identify alternate procedures for meeting objectives. A key assumption is that the emphasis is placed on achieving objectives, not on students participating in activities.

Postassessment like preassessment is related to module objectives. Completion of a module is signaled by successful demonstration of competence on the postassessment.

Three conditions must be met prior to the development of instructional modules:

1. The rationale and basic assumptions for the program are stipulated;
2. The conceptualization of the product has been completed; that is, the basic and optional competencies to be demonstrated by graduates are identified; and
3. Specific objectives for graduates of the program are delineated (Houston, 1972, p. 69).

Houston discusses the development of modules in relation to total program design.

> All too often we begin to design program materials without a relevant context. Many initiate module specifications and materials development with no explicitly stated philosophy for the program, no conceptualization of the roles the graduates will assume, and sometimes no stated objectives. With the need for a "quick return," this short-cut often seems necessary since overall design of a program is time-consuming, often frustrating, and causes a teacher proparation staff to confront themselves with their philosophical differences. Faced with seemingly insurmountable barriers to progress, the program designer often turns to piecemeal development, hoping the pieces will eventually fit together. Each piece stands alone, isolated, often excellent in its own right but with little evidence of contributing to the total program design is a necessary prerequisite to the development of modules (Houston, 1972, p. 70).

Logically derived objectives should be arranged into a meaningful sequence based on student readiness and development. One basis for such

an ordering employs the structure of the content as guide, progressing from simple notions to complex principles in a flow process pyramiding concepts to maintain sufficient challenge.

Institutional Resources

The optimum instructional location and the facilities needed for various learning experiences must be considered in any program design. Additionally, location and facilities provide guidelines for ordering and clustering objectives. Some learning experiences providing for the development of knowledges may be carried out in the classroom through lecture/discussion and audio-visual presentations. Other experiences involving simulations can occur either in the shop or laboratory or on the job. Other experiences may necessitate introduction to jobs through exploratory activities and then actual on-the-job training. Practical considerations relative to job sites and cooperative relationships largely dictate location, sequence, and degree of involvement for on-the-job experiences. Supplementary experiences can be afforded through the purchase of commercially available modular instructional materials. A learning resource center is often established in a central location to allow students to obtain modules and to use accompanying films, filmstrips, and other resource materials made available to expand learning experiences.

Teacher Orientation and Roles

During the initial stage in program development, involving personnel is essential. Teachers generally want to be involved in innovations; if institutional constraints prohibit direct involvement, then teachers at least wish to avoid appearing uninformed or using the latest instructional techniques incorrectly. Initial involvement of concerned personnel in

program planning will prevent undermining by the usual human reaction of distrust of new concepts not yet understood and rejection of programs to which they were not requested to contribute. Houston (1972, pp. 11-12) has described the initial stage of program development as follows:

> Long-range commitment and integration of CBI entails early efforts to involve staff in awareness conferences, decision-making committees, program design efforts, policy councils, and a continual process whereby contributions are recognized and rewarded.
>
> Orienting concerned persons is an important part of the program design process. Programs could be attempted with little articulation among components or little relevance to teaching. Successful efforts, however, require careful delineation of program objectives and clear definition of basic assumptions upon which they reside.
>
> Planning and management of project efforts undergird both staff development and program design. Long-range plans, based on systems design principles, should be outlined when the program is initiated. While these plans can be changed readily, the stipulation of tasks to be accomplished, their time for completion, and definition of individual responsibilities are essential for effective program development.

Experiences are initially planned at the awareness or interest levels. Conferences or retreats to explore competency-based instruction and occupational certification are a good way to introduce the concept. People appear to be more conducive to the change process when conferences are held in new environments. Reading about CBI prior to discussions often stimulates interest.

Besides developing instructional modules to meet program needs, teachers perform the following roles related to instruction: establishing procedures for assignment of resource persons to students; scheduling conferences between themselves as resource persons and individual students or small groups; providing feedback to students on module evaluation; providing vocational guidance; and resolving conflicts between teacher/student or among students.

Student Roles

Student roles in CBI implementation include actively assuming responsibility for communicating with other students, both to facilitate accomplishment of module requirements and to assure maximum benefits from modular instruction. Student responsibilities for interaction include organizing observations of one another to obtain feedback and organizing group activities such as informal discussions, or seminars with the resource persons. Also, students should assume responsibility for arranging conferences with vocational counselors as needed in addition to the required periodic conferences. There are, however, certain problems related to student achievement in CBI.

> Some students work very hard to accomplish program objectives and adequately demonstrate competencies. Others only minimally meet criteria, and fall behind because of lack of effort. Some procedures should be instituted for accounting for student achievement and identifying those who are not progressing satisfactorily (Houston, 1972, p. 117).

Student assessment should take several factors into account. Both the quality of student-developed materials submitted to meet module requirements and the results of observations of student performance by staff are assessment inputs. Although attendance requirements may be more flexible than in traditional instructional situations, adequacy of meeting minimal attendance requirements is a factor for consideration in assessment. Adequacy of meeting grading criteria for purposes of assigning marks must be considered in relation to meeting competency criteria.

Student concerns regarding procedures related to records include these areas: registration for courses, components, or modules; maintenance of individual students' cumulative files; and provision for student access to records.

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Burns, Richard W., and Joe Lars Klingstedt, eds. Competency-Based Education, An Introduction. Englewood Cliffs, New Jersey: Educational Technology Publications, 1973.

Drumheller, Sidney J. Handbook of Curriculum Design for Individualized Instruction, A Systems Approach. Englewood Cliffs, New Jersey: Educational Technology Publications, 1972.

Finch, Curtis R., and John R. Crunkilton. Curriculum Development in Vocational and Technical Education. Boston: Allyn and Bacon, forthcoming.

Houston, W. Robert. Performance Education Strategies and Resources for Developing a Competency-Based Teacher Education Program. New York: Multi-state Consortium on Performance-Based Teacher Education, 1972.

Use the following points relative to CBI implementation to check your understanding. Circle the YES, ?, or NO column to indicate that each point was fully covered, partially covered, or not covered, respectively.

CBI IMPLEMENTATION CHECKLIST

Situation #1

The comprehensive bases for ordering and clustering total program objectives prior to development of instruction are noted in the memo, including the following:

1. prescribed patterning, to allow attainment of all specified objectives by all enrollees completing the program	YES	?	NO
2. evident contribution to the total preparation program	YES	?	NO
3. sequence, based on student readiness and development	YES	?	NO
4. needs for location and facilities, according to availability and level of desired learning outcome	YES	?	NO

Situation #2

Any four of the following orientation experiences are discussed:

1. awareness conferences	YES	?	NO
2. decision-making committees	YES	?	NO
3. joint program design efforts	YES	?	NO
4. policy councils	YES	?	NO
5. formal process for achievement recognition	YES	?	NO

Situation #3

The following student-related activities required in competency-based instruction are discussed:

1. teacher roles related to instruction			
a. establishing procedures for assignment of resource persons to students	YES	?	NO
b. scheduling conferences between themselves and individual students or small groups	YES	?	NO
c. providing feedback to students on module evaluation	YES	?	NO
d. providing vocational guidance	YES	?	NO
e. resolving conflicts between teacher/student or among students	YES	?	NO
2. active student roles			
a. organizing formal observations of one another .	YES	?	NO
b. organizing group discussions	YES	?	NO
c. organizing seminars with the resource person . .	YES	?	NO
d. organizing conferences with counselors	YES	?	NO

3. factors related to student assessment
   a. adequacy of meeting minimal attendance requirements . . . . . YES ? NO
   b. submitting student-developed materials to meet module requirements . . . . . YES ? NO
   c. results of being observed by instructional staff . . . . . YES ? NO
   d. meeting criteria for grading purposes . . . . . YES ? NO
   e. meeting competency criteria . . . . . YES ? NO
4. official record-keeping procedures for students
   a. registering for courses, components, or modules . . . . . YES ? NO
   b. maintaining individual student's cumulative files in the central office . . . . . YES ? NO
   c. providing student access to their records . . . YES ? NO

LEVEL OF PERFORMANCE: All items must receive YES responses. If any item received a ? or NO response, revise your answers accordingly, or check with your resource person if necessary.

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LEARNING EXPERIENCE III

ENABLING OBJECTIVE

Demonstrate knowledge of the procedure used to identify occupational objectives, the various methods in which teachers can use the occupational objectives, and the implications for administration such as course credit and graduation credit, and occupational certification.

Read Read the "Information Sheet on V-TECS," pp. 22-26.

Review Review the "V-TECS Catalog of Performance Objectives, Criterion-Referenced Measures and Performance Guides for Food Management, Production and Services Occupations."

Plan Develop an outline describing steps to take using V-TECS materials as the basis for development of occupational skills training content for a competency-based vocational program.

Optional Activity Develop a written defense for use by a vocational director in convincing the vocational school faculty to adopt the V-TECS materials rather than continuing to rely upon textbooks and their own past work experience as the major bases for skill training.

Feedback Complete the "Self-Check," p. 26.

INFORMATION SHEET

VOCATIONAL-TECHNICAL EDUCATION CONSORTIUM OF STATES

V-TECS has as its primary goal the development of catalogs containing performance objectives and "criterion-referenced" measures in occupational education. (A criterion-referenced measure is a rigorously-tested exercise designed to determine whether or not a learner has accomplished a given objective.) In addition, the Consortium has the following secondary goals:

- to reduce duplication of efforts;
- to share research and development costs;
- to improve the content validity of vocational-technical programs;
- to promote performance-based instruction;
- to improve the overall accountability of vocational-technical programs; and
- to save dollars (Hirst and Childers, 1974).

The products developed by V-TECS form the basis for designing competency-based, student-centered curricula that will enable learners to acquire skills and knowledges which are actually required on the job. V-TECS materials are based upon research of current practices in performance-based education and upon a thorough analysis of the current tasks being performed by randomly surveyed job incumbents. The use of writing teams along with technically prepared personnel results in catalogs of performance objectives, performance guides, criterion-referenced measures, tool and equipment utilization analysis, and reference lists which serve as resources to derive standards of performance for learners (Hirst, 1975).

V-TECS provides an approach whereby individual performance is measured against job-based standards. If a student cannot perform up to the standards, he or she continues to study the necessary subject matter and to practice the indicated skills, rather than receiving a low grade. The performance objective approach also allows students to enter programs at any point in time and any level of difficulty and to leave when they have demonstrated the skills and knowledge they are required to learn.

A criterion-referenced program based upon performance objectives places all students in competition only with job-based standards rather than in competition with one another for grades as in a traditional program. All students who are properly selected and motivated can satisfy the standards and be certified as competent to perform at a certain level in a given occupation (Hirst and Childers, 1974).

Instruction can be individualized when the teacher develops either modules or training plans based upon the catalogs of performance objectives. Also, the catalogs provide a means of evaluating and updating current training techniques.

To develop performance objectives for students in an occupational program, a V-TECS project's personnel in a state prepare to survey workers and their immediate supervisor in the occupation concerning the context of an occupation. Before surveying these individuals, survey booklets are developed using information from state-of-the-art literature review studies and from intensive interviews with small numbers of workers and supervisors. Persons in the occupation and their supervisors who are surveyed are selected according to a sample design procedure developed by V-TECS.

From the survey, a state obtains data on the tools and equipment used in an occupation, the tasks performed on the job, time spent on the tasks, the difficulty of the tasks, and some information about the job setting. The occupation is then analyzed so that performance objectives and criterion-referenced measures of student learning can be developed. The objectives and measures are computerized according to a format common to all the states so that each catalog can be used by every state.

Members of the V-TECS Consortium are completing development of twenty-eight catalogs listed in Figure 2.

FIGURE 2 - V-TECS Catalogs
Completed or Nearing Completion of Development (Hirst, 1975)

State	Occupational Area	State	Occupational Area
Alabama	Air Conditioning/Refrigeration	Kentucky	Dental Assistant
	Radio & Television		Tractor Mechanic
	Cosmetology		Cashier-Checker
	Alterationist		Bank Teller
	Licensed Practical Nurse		Child Care
	Nurseryman		Carpenter
			Medical Assistant
Georgia	Data Processing		Secretarial
	Machinist		
	Emergency Medical Technician	Texas	Water Operator
			Patrolman
Florida	Auto Body Repairman		
	Turf Management	Virginia	Secretary
	Auto Mechanic		Food Service
			Nursing Assistant
Missi-ssippi	Plumbing		
	Landscaping		

FIGURE 3 - V-TECS Catalogs
Currently Under Development

State	Occupational Area	State	Occupational Area
Alabama	Masonry	Louisiana	Ship & Boat Operation
	Bookkeeper		Hotel/Motel Management
	Nursing		
	Auto Parts Clerk		

State	Occupational Area	State	Occupational Area
Florida	Floriculture	Missi-	Cotton Gin Operator
	Welding	ssippi	Industrial Sewing
	Tax Collector		
	Hospital Ward Clerk	South	Small Engine Repair
	Housing Management	Carolina	Textiel Production
Kentucky	Electricity	Texas	Offset Printing
	Agriculture Power & Machinery		Diesel Mechanic
	Home Furnishing		Drafting
	Florist & Floral Sales		
		Virginia	Logging

Any state may join V-TECS by paying an annual membership fee and a one-time charge for the right to share in prior V-TECS accomplishments, and by agreeing to develop a minimum of two catalogs each year using the V-TECS development model.

Each state is required to designate a full-time technical coordinator within the state. Training programs are provided for state personnel which show them how to write task statements, develop task survey booklets, interview workers and supervisors, design samples, analyze occupational survey data, and write performance objectives and criterion-referenced measures. As of July, 1975, the V-TECS catalogs completed cost in excess of 1.8 million dollars--a price which no single state could afford to pay.

Each state in V-TECS must sign a "Memorandum of Agreement" with certain stipulations. Among other actions, each state must organize pre-service and in-service teacher education programs concerning the proper utilization and implementation of the products. In-service programs for local school personnel further insure that the catalogs of performance objectives are utilized by all teachers to assist students in achieving occupational competence. Personnel from the V-TECS state staff

or from teacher education institutions may be used as consultants for local in-service education programs.

REFERENCES

Hirst, Ben A. Second Progress and Information Report of the Vocational-Technical Education Consortium of States. Atlanta: Commission on Occupational Education Institutions, 1975, p. 1.

Hirst, Ben A., and Childers, Bob E. "A Consortium for Accountability," Technical Education Reporter, September-October, 1974, pp. 53-54.

SELF-CHECK

Develop an outline describing key steps to take when using V-TECS materials as a basis for development of the occupational skills training content in a competency-based vocational school program. If possible, relate to the specific instructional areas included in your school or district.

Optional Activity

You may wish to prepare a defense of using occupational analysis materials such as V-TECS rather than continued reliance only upon textbooks and personal past work experience as a basis of skill training. The defense should be prepared as though for ultimate use by a vocational director discussing the proposed adoption of the V-TECS materials with vocational school faculty.

You may then wish to present your defense to a graduate class in occupational analysis for critique by the students in the class.

Using the following key steps, check your effort in outlining a plan for adopting occupational analysis materials such as V-TECS in a competency-based vocational program. Your outline need not exactly duplicate the model answers; however, you should have covered the same major points.

MODEL OUTLINE OF KEY STEPS

I. Obtain appropriate V-TECS materials including occupational analyses and objectives for all the occupational programs in your school.

II. Obtain consultant services to provide in-service education of the vocational school faculty regarding the content and derivation of the V-TECS materials. Services may be provided by a teacher educator from a teacher education institution or the state's technical coordinator.

III. Have the occupational advisory committees for each vocational program review the materials in their respective areas to determine the objectives and content applicable to training for local employment.

IV. With a representative team of teachers, cooperatively develop program evaluation and student follow-up procedures to insure that the objectives derived from the occupational analysis materials are actually utilized in each of the school's training programs.

LEVEL OF PERFORMANCE: Your completed "Self-Check" should have covered the same major points as the model outline. If you missed some points or have questions about any additional points you made, review the material in the "Information Sheet on V-TECS" or check with your resource person if necessary.

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LEARNING EXPERIENCE IV

ENABLING OBJECTIVE

Prepare a written plan for initiating competency-based instruction (CBI) in a vocational program.

Read Read the "Information Sheet for Implementing Competency-Based Instruction," pp. 29-34.

Plan Develop an outline for implementing key aspects of competency-based instruction in a vocational program.

Optional Activity Write goals and objectives for implementing competency-based instruction.

Feedback Your competency will be evaluated by your resource person, who will review your outlined plan.

IMPLEMENTING CBI INFORMATION SHEET

The process of implementing CBI is presented graphically in Figure 1. Each of the steps in this process is detailed in subsections which follow.

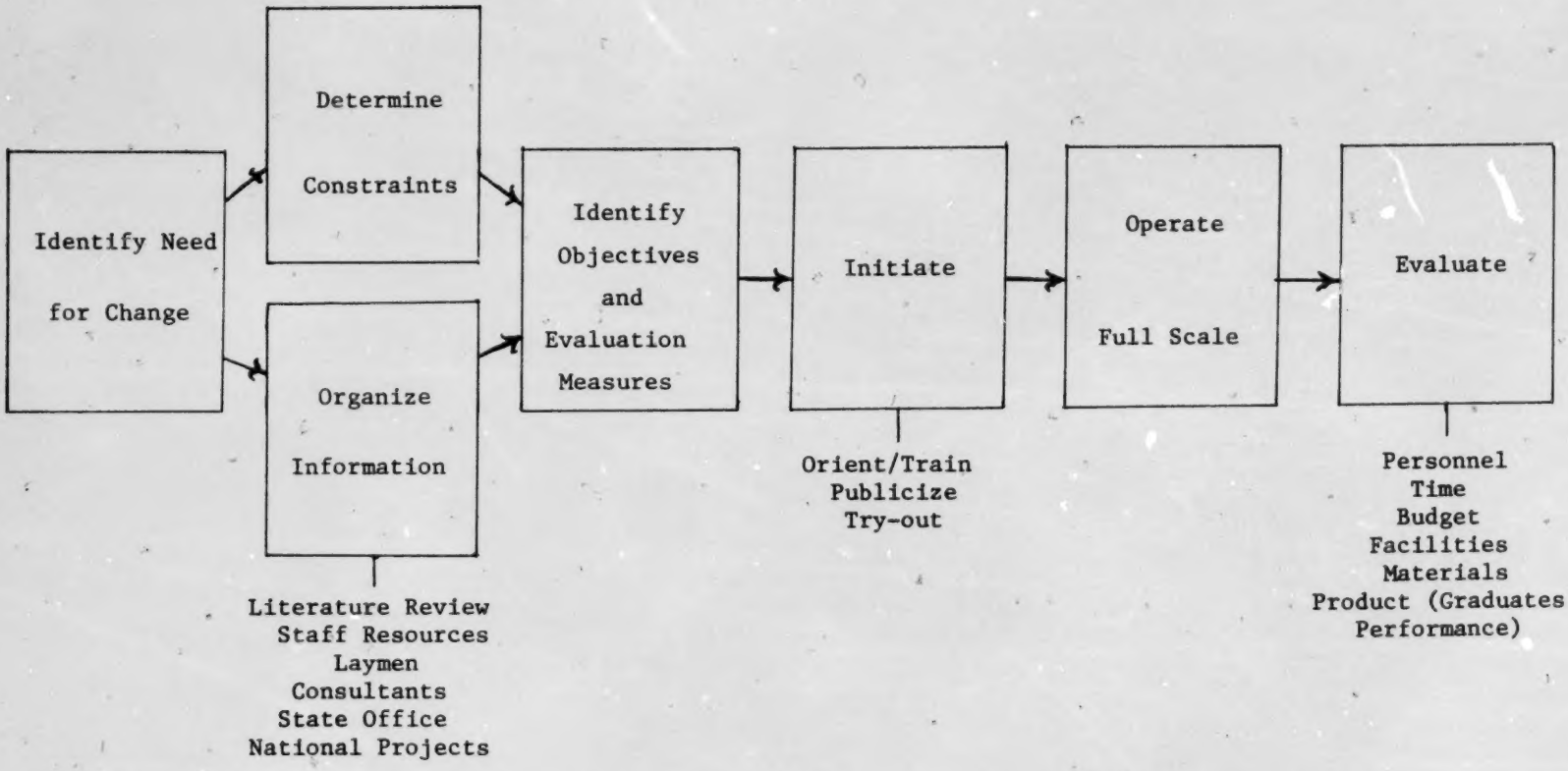
Identifying Need for Change

The basic step for implementing competency-based instruction is to assess the need for change. Program graduate performance is the primary criterion for making this judgment. If on-the-job performance warrants improvement, CBI is a direct means of setting and attaining performance standards.

Organizing Information

After the need for change has been established, pertinent information from a variety of sources and existing resources for implementing CBI should be collected and organized. An overview of alternate implementation approaches can be gained by scanning the literature. Analyzing the effectiveness of national projects is one way to determine workable approaches. Resource persons can provide input regarding applicability of alternative implementation approaches in a given school setting. Individuals who can offer meaningful input include instructional supervisors from the state education department, consultants, administrators from surrounding areas, and local school personnel.

FIGURE 4 - Implementing Competency-Based Instruction



Determining Constraints

Concurrent with activities to organize information, constraints should be determined regarding the use of implementation procedures. Depending on the local situation, constraints may relate to program objectives and instructional content; student progress through the program and duration of individual program completion; the setting of instructional activities (e.g., in-school or on-the-job); and available resources (e.g., in-school or on-the-job); and available resources (e.g., finances, personnel).

Identifying Objectives and Evaluation Measures

Objectives and evaluation procedures must be established at two levels to implement CBI. First, implementation goals and objectives and accompanying evaluation measures must be developed to carry out procedures identified as appropriate for implementing CBI in a given school setting. Specifications of desired outcomes at varying levels are needed to facilitate the process of CBI implementation. Desired implementation outcomes which are broad and less concrete are stated as goals. Goals relate to broad stages and aspects of the total implementation process. They are usually accomplished over a relatively long period of time. Desired outcomes which are specific in nature are stated as implementation objectives. Objectives specify procedures to carry out particular aspects of the implementation. Criterion-referenced measures for assessing degree of achievement of specific outcomes should be indicated within each stated objective.

Next, instructional objectives of various vocational program areas should be established. A basis for this is provided by the V-TECS catalogs of performance objectives. Program development involves continuous refinement and validation of objectives. Considerations in selecting

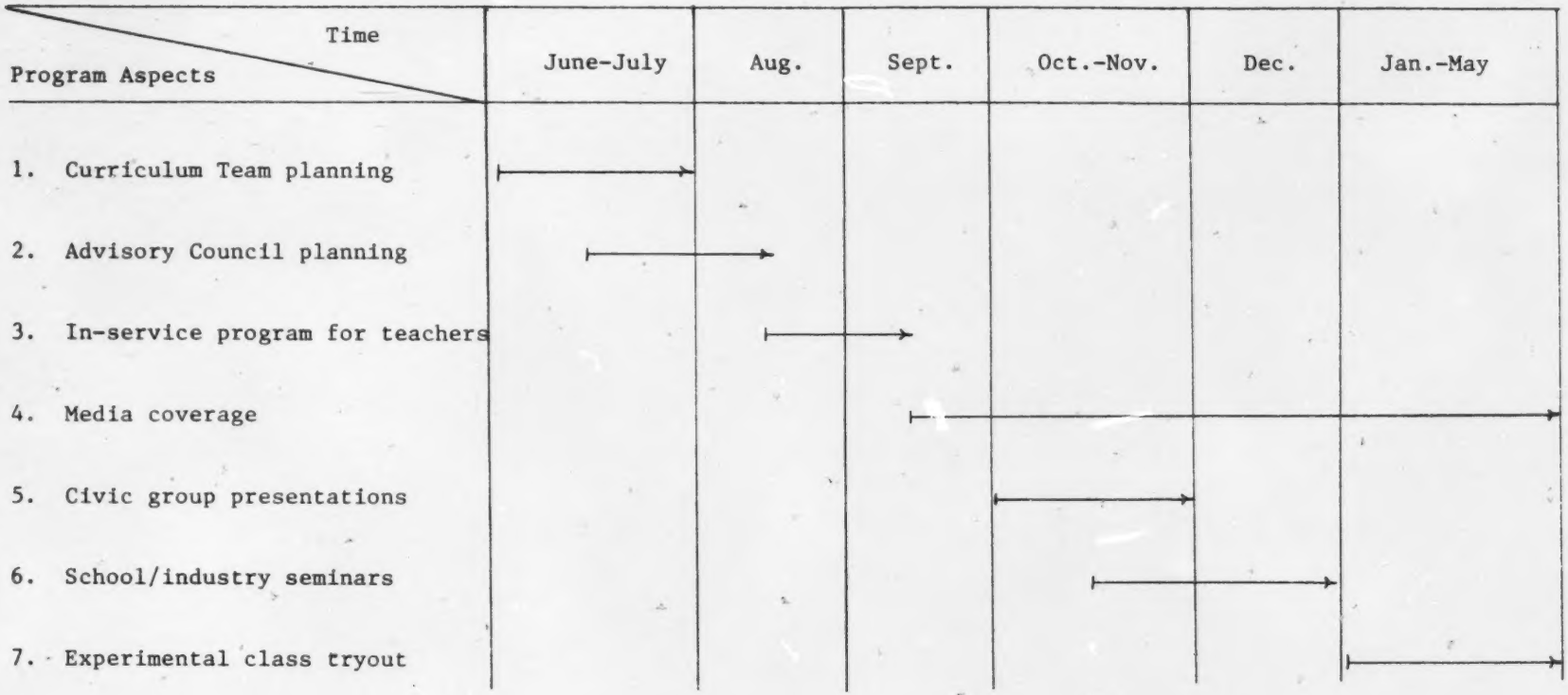
critical competencies for training include how well the competencies discriminate between successful and unsuccessful workers, and how precisely defined the training results are. After verifying instructional objectives locally through occupational advisory committees for each vocational program, appropriate means of evaluating each objective in terms of student performance should be established.

Data on student performance in achieving vocational program objectives for instruction serve as one indicator of implementation success. Thus, instructional objectives developed for specific programs relate back to the more general goals and objectives previously derived for the total implementation process.

Initiation

Several aspects are included in initiation of CBI. First, the instructional staff must be oriented and/or trained to implement CBI in a given school setting. Then, to insure optimum competency attainment, it is desirable to provide training experiences for students beyond classroom confines. Successful involvement of persons concerned with out-of-school training is enhanced through pre-publicity directed to them. Finally, smooth operation of the full-scale CBI program is facilitated by first arranging a "try-out" involving selected teachers and programs. Both instructional staff and students should evaluate the effectiveness of the initial phase with the view of improving overall implementation. A time-line chart for scheduling program initiation activities to concur with time constraints in a realistic setting is illustrated on page 33.

FIGURE 5 - Schedule for Program Initiation



Beginning Full-Scale Operation

If a proper foundation has been established in previous steps, full-scale operation should go smoothly. Administration of the total operation should support active student roles and the teacher roles related to instruction (e.g., module development, conferences with students, vocational guidance activities) required in CBI. Another administrative concern relates to student assessment and official record-keeping procedures for students.

Evaluating Program Effectiveness

The key to CBI program effectiveness is graduate performance. This can be assessed through follow-up activities to secure feedback from both graduates and their employers. Evaluation techniques should also be used to obtain self-evaluation from instructors. When compiled, the data should be of much value for accountability purposes. Facilities should be assessed relative to present adequacy and projected needs. Efficiency in use of time should be considered in relation to benefits, as compared to traditional instruction. The basic intent of allowing students to progress at their individual rates should not be overruled, however. Instructional materials are evaluated in relation to their adaptability to to individualized use by students. The materials should be sufficiently motivating to promote self-directedness and useable with a minimum of assistance by instructors. Additionally, they should provide accurate, up-to-date information which prepares students to meet current job-based performance standards. Instruments designed to assess student reactions to the materials can provide useful input. Of course, graduates' performance will also reflect the quality of instructional materials used.

Optional Activity: You may wish to gain experience in writing goals and objectives for implementing competency-based instruction. The following activity checks your understanding of the "Information Sheet," pp. 29-34.

OPTIONAL SELF-CHECK

I. Develop a goal for implementing competency-based instruction within the total vocational program. Remember that goals are more difficult to measure than objectives but are equally important. .

II. Develop at least two objectives which would contribute to accomplish- of the overall program implementation goal. Remember to include the activity, criterion, and conditions.

MODEL GOAL AND OBJECTIVES

I. Provide an individualized program of instruction to facilitate student achievement of competencies derived from explicit concepts of worker roles.

II.

A. Design instruction in which 80 percent of the terminal objectives in a program afford alternative means for student achievement.

B. Provide sufficient program flexibility to allow all students to proceed at individual rates in mastering a minimum set of competencies.

DEVELOPING A PLAN FOR IMPLEMENTING CBI

The outline you will be developing should give you a chance to use your knowledge of implementation considerations for competency-based instruction.

You will develop this outline from the viewpoint of your assigned role as the local vocational director. The vocational program areas under your direction are as follows:

	Program	# of Students
1.	Factory Sewing	15
2.	Retail Clerk/Stocker	25
3.	Cosmetology	20
4.	Bricklaying	15
5.	Child Care Aide	15
6.	Ornamental Horticulture	15
7.	Drafting	25
8.	Auto Mechanics	25
9.	Business and Office Related Occupations	25
10.	Forestry Technician	20

Sixty-five per cent of the students are categorized as middle class. Twenty-five per cent are considered economically disadvantaged. Forty per cent are nonwhite.

There is a range of typical reactions among the faculty regarding any curriculum revisions. Several of the instructors are acquainted with competency-based instruction and have strong feelings about this particular innovation. Faculty reactions according to program area are as follows:

1. Factory Sewing. The instructor is not familiar with CBI but is willing to make whatever revisions are necessary.

2. Retail Clerk/Stocker. The instructor was introduced to the CBI concept in a college class and is enthusiastic about making required revisions in his program.

3. Cosmetology. The instructor is hesitant to make any changes in the present program, which has been aligned with state licensing requirements.

4. Bricklaying. The instructor feels any curriculum revisions, including CBI, are unnecessary paperwork which interfere with his program.

5. Child Care Aide. The instructor was introduced to the CBI concept in

a college class but does not feel it is suitable for the child care program. This instructor is against curriculum planning involving specific behavioral objectives.

6. Ornamental Horticulture. The instructor is not familiar with CBI but is willing to make whatever revisions are necessary.

7. Drafting. The instructor is not familiar with CBI but is willing to make whatever revisions are necessary.

8. Automechanics. The instructor is not familiar with CBI but is willing to make whatever revisions are necessary.

9. Business and Office Related Occupations. This instructor is most familiar with CBI and has already taken the initiative to make revisions in planning for CBI implementation in the office occupations program.

10. Forestry Technician. The instructor is not familiar with CBI but is willing to make whatever revisions are necessary.

The superintendent has agreed to pay five faculty members to work this summer on curriculum development leading to CBI implementation through the vocational school program. When you informed the faculty of this, several volunteered for the summer work. Some of them seem to be interested primarily in the extra pay. The volunteers include the following: Retail Clerk/Stocker instructor, Ornamental Horticulture instructor, Drafting instructor, and Business and Office Related Occupations instructor. You will have to persuade one more instructor to join the team. The superintendent believes it would be best to include one representative of the negative viewpoint toward CBI. Indicate your addition to the team and justify it in the outlined plan.

The superintendent has decided that you and the faculty team should plan for CBI initiation in progressive stages due to considerations such as limited printing budget, negative reactions from some faculty, and public relations for the program innovations that must be undertaken with local employers and the general public. Expand the outlined plan to describe how you would provide the ground work for implementation, including budgetary support for each phase of initiation. An outline worksheet is provided as a planning guide.

WORKSHEET

I. Addition of vocational teacher to CBI curriculum team--Criteria for choice

II. Strategies for progressive CBI implementation

A. Participation of community advisory council (e.g., publicity, occupational analysis)

B. Advisory council participation costs (e.g., dinner meetings, duplication of information materials)

C. Teachers' inservice program (e.g., curriculum team participation, initial teacher awareness)

D. Inservice teacher program costs (e.g., duplication of information materials, task listings for each occupational area, schedules for planned implementation)

E. Media coverage (e.g., newspapers, radio)

F. Media coverage costs (e.g., newspaper and radio, other)

G. Civic group presentations (e.g., presentations to Chamber of Commerce, civic organizations)

H. Civic group presentations costs (e.g., audio-visual information materials, printed brochures)

I. School/industry seminars for concerned personnel (e.g., school participation, industry participation)

J. School/industry seminar costs (e.g., transportation costs, release time/substitutes)

K. Experimental try-out with selected classes (e.g., resources, including equipment, evaluation)

L. Experimental try-out with selected classes--costs (e.g., resource materials and equipment, data collection and analysis)

Your outlined plan will be reviewed by your resource person, according to whether consideration was given each point related to initiating CBI in the implementation process.

LEVEL OF PERFORMANCE: If your resource person finds deficiencies exist relating to the initiation of CBI in your outlined plan, review this learning experience and revise your outlined plan as necessary.

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MODULE ASSESSMENT*

TERMINAL OBJECTIVE
Plan strategies to implement instruction which focus directly on developing those tasks, skills, attitudes, values, and appreciations that are deemed critical for successful employment (competency-based instruction).

Plan Develop a plan for implementing competency-based instruction in a vocational-technical school, utilizing input from various groups that will be affected by a change from traditional instruction. If possible, relate to the specific instructional programs in your school or district.

Review Review your plan with two of your peers. Use their suggestions in revising the plan.

Optional Activity Interview at least one knowledgeable vocational director to determine the strategies which one should use in implementing competency-based instruction in a vocational-technical school.

Feedback Your total competence will be assessed by your resource person, using the "Performance Assessment Form," p. 45.

Based upon the criteria specified in this assessment instrument, your resource person will determine whether you are proficient in implementing competency-based instruction.

*You may choose to complete this assessment without completing the first four learning experiences if you think you have the proficiency to do so.

Plan

The plan you will be developing should give you a chance to use your knowledge of strategies for implementing competency-based instruction in a vocational-technical school.

This plan must include a time-line for implementing competency-based instruction throughout the school program, along with the people involved in each activity (including their role and function), and the procedures for securing and using information from (a) advisory committee, (b) former students, (c) faculty, (d) local employers, (e) occupational studies, (f) available curriculum guides such as "Vocational-Technical Education Consortium of States" (V-TECS), (g) State Department of Education, and (h) consultants.

Describe procedures for carrying out total program implementation including (a) program planning, (b) State Department and school board approval, (c) staff orientation, (d) public relations, (e) facilities arrangement, (f) curriculum development, (g) materials selection and development, (h) student orientation, (i) student assessment and records, (j) initial try-out, (k) full-scale implementation, and (l) evaluation and follow-up.

Your plan's format should include an overall goal, specific objectives, a list of activities, and evaluation procedures for each aspect of the program.

The chart on p. 44 includes an outline of each program aspect to be implemented. This is the format for an implementation design chart you may use to present your outlined plan. Review your plan with two of your peers. Use their suggestions in revising the plan.

Optional Activity

You may wish to arrange to interview at least one knowledgeable vocational director to (1) discuss the strategies for implementing competency-based instruction from personal experiences, (2) generate a list of strategies typically used for implementing competency-based instruction in a vocational-technical school, (3) suggest possible new strategies for implementing competency-based instruction in a vocational-technical school.

FIGURE 6 - Implementation Design Chart

Outline of Program Aspects	Activities	Personnel Functions	Constraints	Information Sources	Budget	Evaluation
I. Program planning A. School staff B. Advisory Council						
II. State Department & School Board approval						
III. Staff orientation						
IV. Public relations						
V. Facilities arrangement						
VI. Curriculum development						
VII. Materials selection & development						
VIII. Student orientation						
IX. Student assessment & records						
X. Initial try-out						
XI. Full-scale implementation						
XII. Evaluation & follow-up						

Rate the students' performance in planning each of the following implementation areas in competency-based instruction. Circle the YES, ?, or NO column to indicate that each point was fully covered, partially covered, or not covered, respectively.

PERFORMANCE ASSESSMENT FORM

This plan includes the following:

I.	a rationale			
	A. the need for CBI implementation is stated	YES	?	NO
	B. the general implementation approach is specified	YES	?	NO
II.	objectives of CBI implementation			
	A. statements of the CBI implementation goals are provided for each aspect of the total program	YES	?	NO
	B. the specific objectives for each aspect of the program contribute to accomplishment of the over-all goal for that program aspect	YES	?	NO
III.	design of program implementation			
	A. program procedures (e.g., activities) are outlined for each aspect of the program	YES	?	NO
	B. functions of personnel involved in each program activity are identified	YES	?	NO
	C. implementation design constraints are detailed (e.g., time, money, local needs)	YES	?	NO
	D. sources of information are listed	YES	?	NO
	E. a proposed budget for the implementation is included	YES	?	NO
IV.	follow-up and evaluation			
	A. a general organizational plan (or model) for program evaluation is presented	YES	?	NO
	B. specific means of evaluation are detailed for each aspect of the program, relating to the objectives of that program aspect	YES	?	NO
	C. sources for data collection are indicated	YES	?	NO
V.	a time-line for implementing CBI which includes			
	A. obtaining school board approval	YES	?	NO
	B. assessing community needs	YES	?	NO

C.	gaining state approval for courses	YES	?	NO
D.	obtaining competencies from occupational analyses (V-TECS or other appropriate sources)	YES	?	NO
E.	providing in-service preparation for faculty . .	YES	?	NO
F.	getting input from advisory council	YES	?	NO
G.	fostering public relations for innovation	YES	?	NO
H.	developing curriculum	YES	?	NO
I.	orienting students	YES	?	NO
J.	providing for student assessment and record-keeping	YES	?	NO
K.	carrying out evaluation and follow-up	YES	?	NO

LEVEL OF PERFORMANCE: All items must receive YES responses. If any item received a ? or NO response, discuss this with your resource person and, if necessary, the learning experience, or part of it, must be repeated.

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